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ABSTRACT

Graduate and professional schools usually base their admissions decisions on a combination of test scores and on an overall index of undergraduate achievement such as cumulative grade-point average or rank-in-class. The present study sought to investigate whether considering more specific indices of undergraduate performance, through a detailed analysis of college transcripts, could lead to increased accuracy in predicting law school performance. Stepwise multiple regression analyses, performed separately for each of two schools, resulted in the selection of the LSAT, social science GPA, and a moderator variable as the most useful predictors. Because of the effects of selection, however, caution was urged in interpreting the results. (Author)

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Richard R. Reilly

RESEARCH BULLETIN

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Abstract

Graduate and professional schools usually base their admissions decisions on a combination of test scores and on an overall index of undergraduate achievement such as cumulative grade-point average or rank-in-class. The present study sought to investigate whether considering more specific indices of undergraduate performance, through a detailed analysis of college transcripts, could lead to increased accuracy in predicting law school performance. Stepwise multiple regression analyses, performed separately for each of two schools, resulted in the selection of the LSAT, social science GPA, and a moderator variable as the most useful predictors. Because of the effects of selection, however, caution was urged in interpreting the results.

CONTRIBUTIONS OF SELECTED TRANSCRIPT INFORMATION

TO PREDICTION OF LAW SCHOOL PERFORMANCE

Richard R. Reilly

It is not surprising that past academic performance has often been found to be the best single predictor of future academic performance. Admissions offices in graduate and professional schools have long recognized this fact, and as a result virtually all schools require complete records of previous performance in the form of transcripts. The use then made of this transcript information may depend upon individual admissions offices, but judging from statements in college and graduate school catalogues and most published prediction studies one overall index of individual performance such as rank-in-class or GPA is given heavy weight in admissions decisions, while more specific information is often largely ignored. It seems plausible, however, that a more careful breakdown of the undergraduate record might lead to increases in predictive accuracy. This may be especially true in the professional and graduate school settings where specific groups of undergraduate courses can be judged as being more or less relevant to graduate study in a given area. On a conceptual level, at least, grades in undergraduate biology courses should be more highly related to medical and dental school studies than grades in, say, English literature. The usual cumulative GPA, of course, does not include any a priori weighting of subjects with respect to their relevance for any particular field, but for most graduate and professional fields a number of specific hypotheses could be generated as to which courses or items of information might be most important or relevant.

The present study was exploratory in nature, the major purpose being to investigate whether any increase in prediction of law school performance could

be effected by a more thorough consideration of the undergraduate record. It was also hoped that this study would suggest other hypotheses for future research.

Method

The sample consisted of 134 first-year law school students from school A and 85 first-year students from school B. The following variables were extracted from the students' undergraduate transcripts.

The first five variables were dummy variables denoting a specific category. Students who fell into the category were given a 1, students who did not, a 0.

1. Major in Humanities (Maj Hum) included all students majoring in English, languages, philosophy, theology, speech, dramatics or related subjects.

2. Major in Social Sciences (Maj SS) included students majoring in economics, history, political science, business administration, geography, sociology, anthropology or related subjects.

3. Major in Science[1] (Maj Sci) included all students majoring in physics, chemistry, biology, psychology, geology or related fields.

4. Changed Major (Cha Maj) included all students who changed their major at least once during their undergraduate careers.

5. Year Graduated (YG): all students graduating in a year earlier than 1969 were given a 1 on this variable.

The next nine variables were based on grades in specific courses or years. Since the undergraduate colleges involved employed a variety of grade scales, all grades were converted to a 0-4 (low-high) scale for study purposes.

6. Cumulative GPA for four years (GPA).

7. Average GPA in Humanities (Hum GPA) (i.e., average grade in all courses falling into the area described in variable 1).

8. Average GPA in Social Sciences (SS GPA) (i.e., average grade in all courses falling into the areas described in variable 2).

9. Average GPA in Sciences (Sci GPA) (i.e., average grade in all courses falling into the areas described in variable 3).

10. Average GPA in Quantitative and Technical (QT GPA) (i.e., average grade in all courses falling into the areas described in footnote 1).

11. Average in Major Subject (Maj GPA) (i.e., average over all years for courses in major subject).

12. Third-year GPA minus first-year GPA ((3-1) GPA).

13. First-year GPA (1 yr GPA).

14. Second-year GPA[2] (2 yr GPA).

The next set of transcript variables consisted of five product terms where in each case one factor was a dummy variable described earlier and the other factor was a quantitative variable. The final "transcript" variable included was the mean LSAT score of all candidates taking the LSAT during 1968-1970 who attended the college from which the transcript was received. This was intended to serve as a very rough indicator of school quality.

15. Variables 1 x 6 (Hum x GPA).

16. Variables 2 x 6 (SS x GPA).

17. Variables 3 x 6 (Sci x GPA).

18. Variables 5 x 6 (YG x GPA).

19. Variables 4 x 12 (Cha Maj x (3-1) GPA).

20. College LSAT Mean (LSAT-M).

Two additional independent variables, Law School Admission Test (LSAT) scores and Writing Ability (WA) scores, were included in the analyses. First-year law average (FYA) served as the dependent variable in both schools.

Two points related to the selection and combination of transcript information for purposes of this study should be clarified. First, it should be recognized that the major subject categories are somewhat arbitrary and certainly should not be taken to reflect any rigid preconceptions held by the author as to the interests, aptitudes, or abilities called for by each. Actually, the categories are quite similar to those used by Cartter (1966) in his study of academic quality of graduate schools, except that his two categories of biological and physical sciences were combined into one science category, and mathematics and accounting were classed with engineering in a quantitative and technical category.

A second point concerns the inclusion of the five product term variables. Since the planned mode of analysis was that of multiple regression, it was decided to use a form of polynomial regression to allow for the possibility that different regression slopes might be required for individuals in different groups for certain predictor variables. It may be helpful for the reader to note that the results obtained when such terms are entered in a multiple regression format are similar to the results of a test of equality of slopes by means of analysis of covariance and can, in fact, be made directly equivalent to the latter (Cohen, 1968). Direct equivalence was not the case in the present study since all of the cross-product terms were entered in with all other variables in a stepwise regression procedure. Retention of one or more of these terms by the stepwise procedure would suggest that group membership might serve as a moderator variable (Saunders, 1956). A

complete model for studying the moderating effects of group membership on prediction would have meant including every possible cross-product of the dummy variables with the continuous predictor variables. In the present case this would clearly have resulted in an unwieldy number of predictors. For this reason it was decided to limit the cross-product terms to five of the most hypothetically tenable.

Results and Discussion

The intercorrelation matrices[3] are shown in Tables 1 and 2. In Table

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Insert Table 1 about here

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2 the year-graduated variable and the product of year graduated and cumulative GPA were not included because all first-year students at school B graduated in 1969.

Insert Table 2 about here

In both schools the FYA criterion correlated most highly with LSAT scores, and social science grades correlated higher with FYA than did cumulative GPA. One other notable observation can be made from Tables 1 and 2. In both schools cumulative GPA was negatively correlated with LSAT and school mean LSAT. In fact, with the exception of SS GPA which had a very modest positive correlation (.05) with LSAT-M in School B, and QT GPA with a similarly modest correlation (.02) with LSAT in School A, GPA predictors correlated negatively with LSAT-M and LSAT in both samples. A similar finding was noted in a recent study of psychology graduate students by Hackman, Wiggins, and

Bass (1970), in which GRE scores were negatively correlated with both undergraduate GPA and a subjective quality rating of the students undergraduate institution. Given a sample of students within a fairly restricted ability range one might expect lower GPAs for students from more prestigious institutions with a resulting negative correlation between the index of school quality and GPA. Astin (1969) has reported data indicating that among undergraduates individuals at a given level of ability typically receive lower grades in selective than in unselective colleges. The negative correlations between LSAT scores and GPA are a bit more puzzling since one would normally expect these variables to be positively related. An explanation may be found in the procedures used to accept students from the larger applicant population. If both GPA and LSAT were given roughly equal weight in accepting candidates, for example, and most candidates with high scores on both variables either did not apply or did not choose to come, the resulting sample of accepted students could have included a much higher proportion of candidates with discrepant scores (i.e., high scores on one variable and low scores on the other) than is true of the general candidate population.

Insert Table 3 about here

The results of the stepwise regression are presented in Table 3 with variables ranked in order of their selection. The stepwise procedure selected all variables resulting in an increase of at least .001 in the squared multiple correlation. Because this is a rather liberal criterion the variables resulting in significant ($p < .05$) increments in the squared multiple R have been asterisked. In both schools the first two variables selected were LSAT and

social sciences GPA, the latter variable barely reaching significance in school B. The third significant variable resulting in school A was a "moderator variable," i.e., the cross-product of the dummy variable denoting year graduated and cumulative GPA. A test of the hypothesis of equal regression slopes of FYA on cumulative GPA in the two groups (i.e., those graduating in 1969 and those graduating earlier) yielded an F value of 6.706 with 1 and 131 degrees of freedom which is significant beyond the .02 level.

Although the model used here was technically different, this finding supports previous evidence that age (which quite clearly is highly correlated with year graduated) is a moderator variable in the law school (Klein, Rock, & Evans, 1968) and Business School (Pitcher & Smith, 1969) settings. The prediction equation for school A[4], considering only the significant variables of Table 3, can be expressed as:

Predicted FYA = .0293 LSAT + 2.8237 SS + .7248δ GPA + 44.6789,

where $\delta = 1$ for individuals graduating before 1969 and 0 otherwise.

It can be seen from this equation that 94 LSAT points have approximately the same effect on predicted FYA as a unit increase in social science GPA and that a small positive adjustment based on GPA is made for pre-1969 graduates. This "adjustment" factor can be considered in light of the Pitcher and Smith data which suggested that older students are underpredicted when a regression equation derived on all students is used.

The equation for school B is:

Predicted FYA = .0014 LSAT + .2143 SS + 1.2900.

In this case a unit increase in social science GPA has about the same effect as 153 LSAT scaled score points. It was unfortunate that the YG x GPA term could not be studied in school B because of the lack of variation mentioned earlier.

Insert Table 4 about here

The results of a second pair of stepwise regression analyses from which the test score variables were excluded are shown in Table 4. Examination of Tables 3 and 4 enables conclusions to be drawn with respect to some of the implicit hypotheses underlying the selection of transcript variables for the study. First, the major subject studied by students does not appear to be useful information for predicting FYA. In the present study the majority of students majored in the social sciences, and consequently there was little variation on each of the three dummy variables denoting major subject area. The possibility exists, however, that some other system of polychotomization might have produced more positive results. None of the three yearly grade averages appeared to be a better predictor of FYA than cumulative GPA, and the degree of improvement shown by a student from the first to third years of college also failed to add much to prediction. On the other hand, breaking GPA down by subject area does appear to be potentially useful. Social science grades, in particular, appear to show promise as a predictor and should be examined in further research. Of the cross-product terms, only one, YG x GPA, was included among the variables adding significantly to the squared multiple R, and this result has been discussed above. It is evident from Tables 3 and 4 that cumulative GPA is not among the more prominent contributors to prediction and that social science GPA appears to be the single best grade variable for predicting FYA. This result as well as all other results reported in this paper should be interpreted with caution, however. The real usefulness of any of the variables studied cannot be fully known without some estimate of the effects of selection on the study samples, and it is possible that selection attenuated the predictive power of cumulative GPA

relative to the other variables. Further research is planned in which data for the entire pool of applicants to a given law school will enable a clearer assessment of the effects of range restriction.

Summary and Conclusions

Selected transcript variables were analyzed along with LSAT, WA and cumulative college GPA in an effort to determine whether any of the transcript variables could effectively increase predictability of first year law average. LSAT proved to be the best single predictor of FYA in the study samples but two especially promising transcript variables, social science GPA and a moderator variable, were identified. Because of the effects of selection caution was urged in the interpretation of results, but it is suggested that further research be conducted on the relationship of some of the more promising transcript variables to law school performance and that provisions be made in such research for the collection of data from the complete applicant pool of the study schools so that range restriction corrections might be applied. This would enable a clearer assessment of the usefulness of each predictor than was possible in the present study.

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Footnotes

[1]A fourth major group was Quantitative and Technical which included majors in engineering, mathematics, accounting, computer sciences or related fields. Students falling into this fourth category were identified by zeros on the first three dummy variables.

[2]Third-year GPA was not included as a separate variable for the same reason a fourth dummy variable was not needed to denote majors in quantitative and technical areas. I.e., the information would have been redundant and would also have made the data matrix singular.

[3]Although third-year average was not included in the original data matrix for reasons noted earlier, the correlations of all variables with third-year averages were estimated by the relationship:

$$r_{1+2\cdot 3} = \frac{r_{13}\sigma_1 + r_{23}\sigma_2}{\sqrt{\sigma_1^2 + \sigma_2^2 + 2r_{12}\sigma_1\sigma_2}} \quad .$$

[4]The grade scale for school A ranged from 50 to 80, while school B operated with the more common 0-4 scale.

Table 1

School A

	FYA	Maj Hum	Maj SS	Maj Sci	Ch Maj	YG	GPA	Hum GPA	SS GPA	Sci GPA	QT GPA	Maj GPA	(3-1) GPA	1 Yr Avg	2 Yr Avg	Hum x GPA	SS x GPA	Sci x GPA	YG x GPA	Ch Maj x (3-1)GPA	LSAT-M	LSAT	WA	3 Yr Avg
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
FYA	1.00	-.06	-.00	.11	-.01	.14	.16	.11	.18	.15	.16	.08	.00	.17	.15	-.06	.04	.13	.19	.01	.16	.35	.23	.13
Maj Hum			-.67	-.14	.04	.16	-.13	.09	-.37	-.06	.05	-.05	-.08	.05	-.13	.99	-.64	-.14	.16	.03	.08	.02	.16	-.04
Maj SS				-.47	.05	-.23	.19	-.09	.28	.04	-.08	.19	.22	-.13	.17	-.66	.97	-.47	-.17	-.07	-.24	-.12	-.16	.12
Maj Sci					-.02	.11	-.09	.01	.03	.03	.03	-.13	-.12	.07	-.07	-.14	-.45	.99	.05	.04	.14	.21	.04	-.07
Ch Maj						.10	-.13	-.01	-.18	-.17	-.34	-.05	.04	-.21	-.17	.04	-.08	-.02	.15	.96	.09	.01	.14	-.13
YG							-.29	-.16	-.28	-.15	-.19	-.25	-.23	-.12	-.17	.14	-.27	.10	.90	.10	.09	.08	.06	-.33
GPA								.76	.76	.67	.49	.76	.13	.70	.72	-.07	.40	-.05	-.15	-.13	-.32	-.21	-.05	.67
Hum GPA									.05	.40	.39	.54	-.02	.62	.56	.14	.09	.04	-.05	-.03	-.22	-.20	.03	.46
SS GPA										.47	.23	.71	.21	.46	.61	-.32	.43	.05	-.19	-.15	-.22	-.22	-.13	.56
Sci GPA											.26	.45	.02	.59	.55	-.04	.20	.06	-.11	-.15	-.23	-.18	-.03	.47
QT GPA												.30	-.18	.59	.38	-.08	.04	.06	-.16	-.34	-.19	.02	-.12	.28
Maj GPA													.29	.42	.59	-.02	.35	-.09	-.17	-.04	-.32	-.24	-.17	.62
(3-1) GPA														-.38	.13	-.08	.24	-.13	-.15	.15	-.05	-.09	-.03	.70
1 Yr Avg															.47	.10	.03	.11	-.08	-.22	-.20	-.11	.04	.40
2 Yr Avg																-.08	.31	-.04	-.08	-.14	-.28	-.20	-.05	.49
Hum x GPA																	.63	-.14	.15	.03	.07	.01	.15	-.01
SS x GPA																		-.45	-.19	-.08	-.29	-.16	-.17	.26
Sci x GPA																			.04	.02	.14	.20	.05	-.04
YG x GPA																				.15	.04	.12	.07	-.22
Ch Maj x (3-1) GPA																					.07	.02	.14	-.02
LSAT-M																						.22	.06	-.21
LSAT																							.43	-.1
WA																								.00

Table 2

School B

	FYA	Maj Hum	Maj SS	Maj Sci	Ch Maj	GPA	Hum GPA	SS GPA	Sci GPA	QT GPA	Maj GPA	(3-1) GPA	1 Yr Avg	2 Yr Avg	Hum x GPA	SS x GPA	Sci x GPA	Ch Maj x (3-1)GPA	LSAT-M	LSAT	WA	3 Yr Avg
		(1)	(2)	(3)	(4)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(19)	(20)	(21)	(22)	(23)
FYA	1.00	.07	-.01	-.09	.07	.08	-.06	.19	.18	.09	.13	-.10	.09	.12	.09	-.00	-.09	.05	.04	.19	.18	-.02
Maj Hum			-.83	-.11	-.06	.07	.18	.00	.05	.18	.04	-.09	.06	.08	.99	-.80	-.11	-.06	-.08	-.05	.03	-.03
Maj SS				-.47	.14	-.05	-.18	.05	-.13	-.14	.00	.11	-.07	-.08	-.82	.97	-.46	.14	.06	-.04	-.02	.05
Maj Sci					-.15	-.02	.04	-.10	.16	-.01	-.06	-.06	.02	.01	-.11	-.45	1.00	-.15	.02	.14	-.00	-.03
Ch Maj						-.22	-.28	-.07	-.18	-.09	.03	.20	-.34	-.15	-.06	.08	-.15	.99	.06	.03	-.02	-.10
GPA							.68	.84	.69	.51	.80	-.19	.73	.83	.14	.15	-.01	-.23	-.12	-.23	.00	.44
Hum GPA								.44	.37	.15	.44	-.20	.59	.54	.22	-.03	.04	-.29	-.18	-.22	.05	.31
SS GPA									.57	.39	.80	-.18	.60	.69	.07	.22	-.09	-.10	.05	-.13	-.03	.34
Sci GPA										.49	.49	-.42	.65	.58	.09	.01	.17	-.20	-.09	-.04	.11	.16
QT GPA											.27	-.34	.52	.35	.22	-.03	.00	-.09	-.21	-.09	.03	.12
Maj GPA												-.01	.50	.61	.10	.15	-.05	.02	-.03	-.22	-.05	.42
(3-1) GPA													-.71	-.27	-.11	.08	-.05	.27	.01	-.05	-.11	.35
1 yr Avg														.59	.13	.07	.03	-.38	-.05	-.16	.08	.17
2 yr Avg															.13	.10	.02	-.17	.01	-.03	.03	.25
Hum x GPA																-.80	.11	-.07	-.10	-.04	.04	.00
SS x GPA																	-.45	.09	.05	-.08	-.03	.13
Sci x GPA																		-.15	.02	.13	-.00	.03
Ch Maj x (3-1) GPA																			.05	-.01	-.03	-.06
LSAT-M																				.30	.22	.04
LSAT																					.51	-.18
WA																						-.04

Table 3

Order of Variables Adding More Than .001 to the Squared Multiple Correlation in Stepwise Regression Analysis

School A			School B		
Variable	Standardized Regression Weight[a]	Multiple R After Addition of Each Variable	Variable	Standardized Regression Weight	Multiple R After Addition of Each Variable
LSAT*	.3066(.3098)	.3497	LSAT*	.1165(.2135)	.1859
SS GPA*	.3715(.3061)	.4377	SS GPA*	.3508(.2133)	.2816
YG x GPA*	.2490(.2062)	.4819	Hum GPA	-.0805	.3045
LSAT M	.2031	.5030	WA	.1019	.3244
QT Av	.2187	.5227	Hum x GPA	.2738	.3416
WA	.1071	.5364	Sci GPA	.2302	.3541
Sci GPA	.1594	.5457	GPA	-.3624	.3703
Maj SS	-.1626	.5520	SS GPA	.2011	.3843
Change x (3-1)	.0908	.5550			
GPA	-.4089	.5593			
(3-1) GPA	.0891	.5607			
1 Yr GPA	.1020	.5629			
Hum GPA	.0646	.5646			
Sci x GPA	.9183	.5658			
Maj Sci	-.8218	.5717			
Maj Hum	.1414	.5748			
SS x GPA	.4551	.5763			
Maj GPA	.0925	.5781			
2 Yr GPA	.0497	.5789			

*Added significantly to squared multiple correlation ($p < .05$).

[a]Standardized regression weights for significant variables only are given in parentheses.

Table 4

Order of Variables Adding More Than .001 to the Squared Multiple Correlation in Stepwise Regression Analysis with LSAT and WA Excluded

School A			School B		
Variable	Standardized Regression Weight[a]	Multiple R After Addition of Each Variable	Variable	Standardized Regression Weight	Multiple R After Addition of Each Variable
YG x GPA*	.3886(.2633)	.1937	SS GPA*	.3738(.1857)	.1857
SS GPA*	.3298(.2424)	.2959	Hum GPA	-.0704	.2399
LSAT M*	.2527(.2442)	.3634	Sci GPA	.2781	.2695
QT GPA*	.2379(.1909)	.4066	GPA	-.4468	.3028
Sci GPA	.1160	.4153	Hum x GPA	.2707	.3218
Change x (3-1)	.1245	.4204	SS x GPA	.1939	.3372
Maj GPA	-.1517	.4263			
Maj SS	-.2172	.4317			
Sci x GPA	.9483	.4405			
Maj Hum	.2334	.4511			
Hum x GPA	-.0469	.4572			
Maj Sci	-.7612	.4607			
Change Maj	-.0215	.4636			
YG	-.1265	.4647			
GPA	-.3664	.4666			
SS x GPA	.5570	.4677			
1 Yr GPA	.1340	.4687			
(3-1) GPA	.0882	.4709			
2 Yr GPA	.0451	.4718			

*Added significantly to squared multiple correlation ($p < .05$).

[a]Standardized regression weights for significant variables only are given in parentheses.